IN THE CLAIMS

1. (currently amended) A system for monitoring engine performance, said system comprising:

an engine model:

a component quality estimator coupled to said engine model; and

a fault detection and isolation classifier coupled to said engine model and to said component quality estimator, said engine component quality estimator generates performance estimates, said model generates virtual parameters based on the performance estimates and engine operating conditions.

2. (original) A system in accordance with Claim 1 wherein said model comprises a component level model of an engine.

3. (original) A system in accordance with Claim 1 wherein said component quality estimator comprises a linear regressor.

4. (original) A system in accordance with Claim 1 wherein said fault detection and isolation classifier comprises a feed-forward neural network.

5. (original) A system in accordance with Claim 1 wherein said fault detection and isolation classifier comprises a linear regressor.

6. (canceled)

7. (currently amended) A system in accordance with Claim 6 1 wherein said fault 20 detection and isolation classifier identifies fault conditions based on said virtual parameters and engine sensor values.

8. (currently amended) A system in accordance with Claim 6 1 wherein said engine virtual parameters are subtracted from engine sensor values to generate sensor deltas supplied to said fault detection and isolation classifier.

2

9. (original) A system in accordance with Claim 8 wherein reference sensor deltas are generated and are compared to later obtained sensor deltas to generate sensor delta-deltas supplied to said fault detection and isolation classifier.

10. (original) A system in accordance with Claim 1 wherein said model 5 generates virtual sensor values based on engine operating conditions, and said component quality estimator generates quality estimates based on said virtual sensor values and engine sensor values.

11. (original) A system in accordance with Claim 10 wherein said engine component quality estimator generates an initial quality estimate and a final quality estimates, and the initial and final quality estimates are compared to generate a delta quality supplied to said fault detection and isolation classifier.

12. (currently amended) A method for monitoring engine performance, said method comprising the steps of:

supplying engine operating conditions to an engine model;

supplying engine sensor values to an engine component quality estimator;

generating a fault detection based at least in part on engine model outputs, and at least in part on estimator outputs; and

supplying the estimator outputs to the engine model.

13. (canceled)

14. (currently amended) A method in accordance with Claim ~~13~~ 12 wherein the engine model generates sensor estimates, and said method further comprises the step of generating sensor deltas by comparing the sensor estimates to engine sensor values.

15. (original) A method in accordance with Claim 12 further comprising the step of supplying the engine model outputs to the engine component quality estimator.

16. (original) A method in accordance with Claim 15 further comprising the steps of:

operating the engine component quality estimator to generate an initial quality estimate and a final quality estimate; and

3

comparing the initial quality estimate to the final quality estimate to generate a delta quality.

17. (currently amended) A method in accordance with Claim ~~13~~ 12 wherein the engine model generates sensor estimates, and said method further comprises the steps of:

generating a reference sensor delta by comparing the sensor estimates at a first operating point;

generating a current sensor delta at a second operating point; and

generating a sensor delta-delta by comparing the reference sensor delta to the current sensor delta.

18. (original) A method for monitoring engine performance, said method comprising the steps of:

generating a reference sensor delta by comparing sensor values with sensor estimates at a first operating point;

generating a current sensor delta at a second operating point;

generating a sensor delta-delta by comparing the reference sensor delta to the current sensor delta; and

generating a fault detection based upon the sensor delta-deltas.

4